

UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

**NUMERICAL SOLUTION OF ESTIMATING TIME OF DEATH BY
NEWTON'S LAW OF COOLING MODEL**

P54S19

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Report submitted in partial fulfillment of the requirement

for the degree of

Bachelor of Science (Hons.) Mathematics

Faculty of Computer and Mathematical Sciences

DECEMBER 2019

ACKNOWLEDGEMENTS

IN THE NAME OF ALLAH, THE MOST GRACIOUS, THE MOST MERCIFUL

Firstly, we are grateful to Allah S.W.T for giving us the strength to complete this project successfully.

We would like to express our gratitude to our families for always encouraging and supporting us in doing this research. Next, we would like to thank our beloved supervisor, Puan Rahmah Binti Shahril for the guidance and supervision as well as for providing necessary information regarding this research and for her support in completing this research.

Our sincere thanks to our lecturer Puan Nur Azlina Binti Aziz too, for the guidelines and encouragement in teaching us this course. Also, we would like to extend our gratitude to Dr Maznah Banu Md. Habiboo Raman for the advises in completing this research. Last but not least, special appreciation to our friends who contribute in finishing this research.

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ABTRACTS

Forensic science is an application of science to criminal and civil laws. In forensic science, one of the most important issues is to estimate the time of death (TOD) especially during suicide, murder or suspicious death cases. Newton's Law of Cooling model has been widely used to estimate the time of death. In estimating the time of death, Newton's Law of Cooling model is solved analytically and numerically. Numerical method is a complete and specific set of procedures that is used to solve Newton's Law of Cooling model. In this study, there are two different murder cases to be considered in predicting the time of death and the method of solving for this problem are Euler method and Runge-Kutta 4th Order. We solved analytically by separable and numerically by Euler method and Runge-Kutta 4th Order. Next, by identifying the problem and solving the model analytically and numerically, the time of death is predicted. The results are obtained by using the MATLAB software and it is displayed graphically. The range for the solution of estimating time of death for Case 1 is in between 9.40 pm and 9.45 pm while for Case 2 the solutions range are from 10.00 pm to 10.05 pm. Based on relative error, it can be concluded that Runge-Kutta 4th Order has better estimation for both cases compare to Euler method since it gives smaller error than Euler method. For further study, other numerical methods such as Adam Bashforth Method, Runge-Kutta Fehlberg Method and Finite Difference Method can also be used in order to get better estimation time of death.